

## GLADIATOR TELESCOPIC STEEL COVERS

02

SERVICE &amp; QUALITY

Telescopic steel covers are used to protect slideways in certain machine tool applications. They offer effective protection against swarf and other debris.

Liquid or coolant ingress can be effectively reduced by feature design and the use of suitable wiper systems.

08

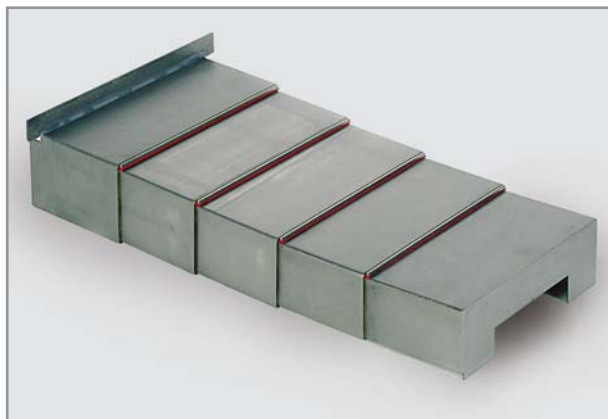
STANDARD BELLOWS

The benefits:

- Cost efficient production
- Efficient wiper systems
- High quality production
- Repair service and spare parts ex stock
- Fast design and delivery times

18

SAUWRAI BELLOWS



26

SPECIAL BELLOWS

34

BACKWALL SYSTEMS

38

GLADIATOR STEEL COVERS

### Design

- The depth of one individual box section should not be larger than 750 mm
- The cover height should not be larger than the length of the cover because of the danger of it falling over.
- The relation of box depth to box width should not exceed 1:6
- Principally use only graded types where each wiper rests on the adjacent box section. Designs where wiper overhang can result in swarf ingress.
- With coolant, the top of the covers should be inclined at an angle of 5°
- In principal, allow space for an underside return of the box sections, as this will stiffen the structure and will provide a constant pretension
- The minimum distance of the smallest box to the guiding position should be 12 mm
- For calculating the travel of the cover, add 5 mm of reserve per box to the travel of the machine
- For covers used in vertical position, gliders should be used for the underside return, which should be screwed on at least to one side for later (dis)mounting
- As a general rule is: maximum extension and minimum compression should be at maximum in the ratio 10:1

46

ROLLER SYSTEMS

58

DURASPRING SPIRAL SPRINGS

68

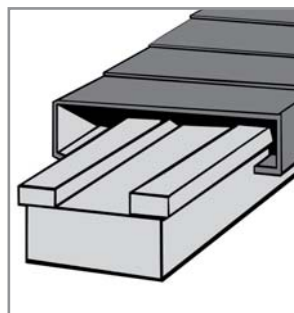
VIEWING SYSTEMS

### Material

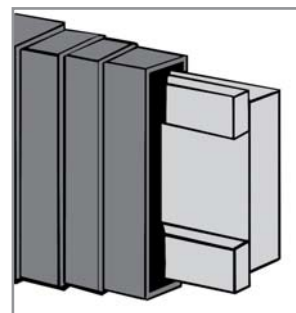
The steel covers are produced from high quality cold-worked sheet steel in material thickness from 1.5 to 3 mm, or if required in stainless steel.

For all common types of machines a suitable type of cover (e.g. horizontal, vertical, inclined; transversed) together with the corresponding guide way solutions is available.

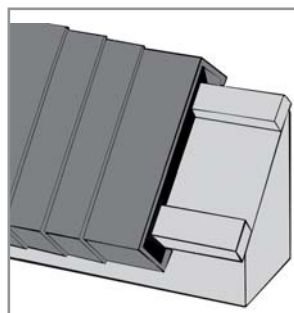
### Samples of cover type



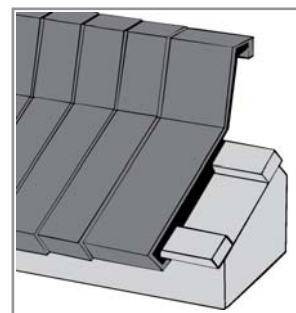
Horizontal



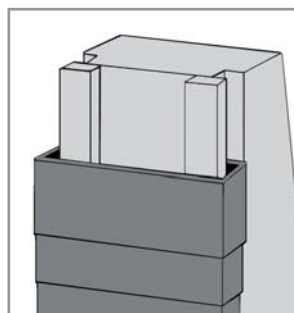
Transversed



Inclined



Inclined, folded



Vertical

### Impermeability of telescopic steel covers to coolant

Due to the design of steel covers a complete sealing against fluids cannot be guaranteed.

The standard types generally provide sufficient coolant protection. For high coolant flow rates, additional internal drainage channels, or a thermally bonded ELASTIC bellow underneath can offer additional protection.

# GLADIATOR COMPONENTS

Telescopic Steel Covers can be custom built to suit any application by adding further individual components.

## Wiper profiles

For Telescopic Steel Covers different wiper systems are available. In addition to standard wipers also wiper systems with replaceable lips or additional lip protection are available.

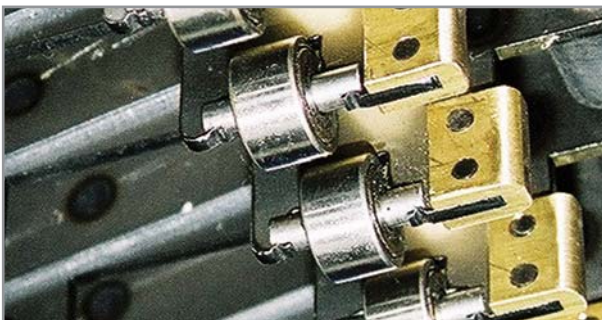
All systems come with optimised wiper profiles and differing degree of hardness for dry and wet machining. For more detailed information of these systems please see the following pages.



Wiper

## Support and guideway gliders

Telescopic Steel Covers up to a weight of approx. 50 kg can be supported by guideway gliders. Special profiled brass parts with sufficient contact width (appr. 5 mm) suitable for hardened and soft guideways, or with PUR inserts.



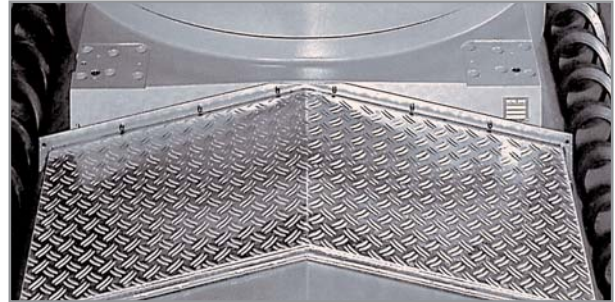
Supporting rollers with lateral brass guides

## Supporting rollers

For covers greater than 50 kg unloaded weight supporting rollers are recommended. Hardened guideways (>58 HRC) or separate support/guideways are required, no matter how large the total number of rollers, assume that the total weight is supported on no more than for rollers.

## Walk-on area

As an option a chequered plate to walk on can be added to the largest box section for easier maintenance of the machine.



Walk on area on largest box

## Access window

By building in access windows (an option) into the largest box, the maintenance and repair of the machine parts underneath can be achieved without having to remove the complete cover.

## Pantograph systems

For high speed of more than 30m/min we build in pantograph systems (graded versions as well). The space required will be increased in this case.



Telescopic steel cover with pantograph

## Glider and damper systems

Glider and damper systems reduce impact, noise and friction. Optionally, wipers with dampers can be used as well.

## Mounting

For mounting/dismounting and transport, suitable lifting lugs can be fitted.

SERVICE & QUALITY	02
STANDARD BELLOWS	08
SAUWRAI BELLOWS	18
SPECIAL BELLOWS	26
BACKWALL SYSTEMS	36
GLADIATOR STEEL COVERS	39
ROLLER SYSTEMS	46
DURASPRING SPIRAL SPRINGS	58
VIEWING SYSTEMS	68

## GLADIATOR REALIZATION

02

SERVICE & QUALITY

08

STANDARD BELLOWS

18

SAUMIRAI BELLOWS

26

SPECIAL BELLOWS

34

BACKWALL SYSTEMS



GLADIATOR Telescopic steel cover

40

GLADIATOR STEEL COVERS

46

ROLLER SYSTEMS

58

DURASPRING SPIRAL SPRINGS



68

VIEWING SYSTEMS



GLADIATOR Telescopic steel covers are individually designed for each machine to meet special requirements.

For special requirements, covers greater than 5 metres width and expansion more than 15 metres can be realized

All parts of this construction are individually designed and checked for smooth operation.

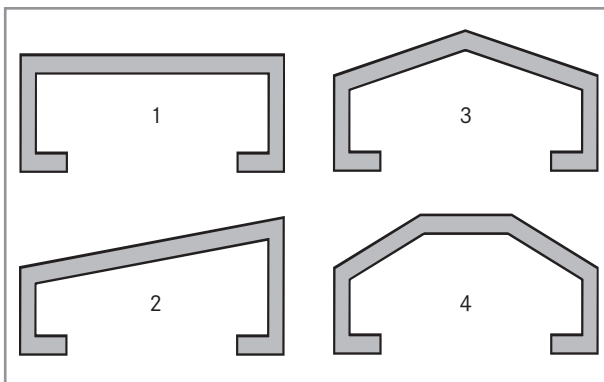


# GLADIATOR DESIGNS

## Designs

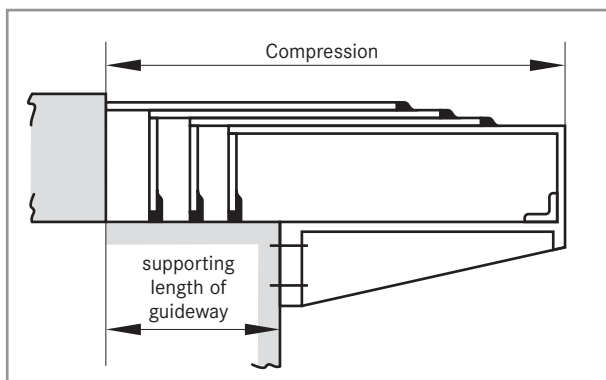
Telescopic steel covers can be produced in different designs:

- Standard design (1): cost-efficient, suitable for most standard applications. It can be used without problem up to a width of 900 mm
- Inclined shape (2): provides optimal drainage of liquids
- Roof shape with single edges (3): for larger widths, additional returns are required to increase the cover stiffness. Provides optimal drainage of coolants.
- Roof shape with double edges (4): for larger widths, additional returns to increase the cover stiffness, optimal drainage of fluids.



If the compression exceeds the available supporting length, a support box section has to be added.

For the opposite case, the largest front box section may be extended by a plate. The problem here is that chips and dirt may accumulate impairing the functioning of the cover.



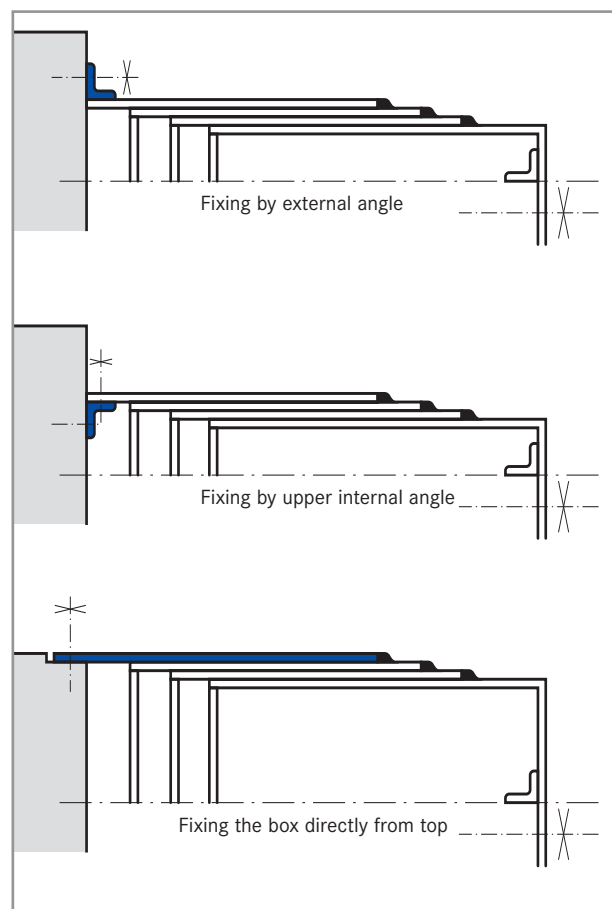
Pay attention to a smooth transition from the guideway to the machine bed extension.

Extensions are required only in the area of the support gliders. They can be manufactured from common steel (i.e. St37K).

## Mounting

For mounting and fixing of the steel covers we offer you solutions specifically to the customer's individual requirement. The covers are fixed either directly to the corresponding first or final box section or by additional fixing brackets which may be attached internally or externally.

- Fixing by lateral external angle (recommended)
- Fixing by upper internal angle.
- Fixing the box directly from the top - high positional accuracy is required.



## Transport

The covers are transported in the closed position; additionally they should be stored in an environment without humidity.

Before shipping, the telescopic steel covers are sprayed with an anti-corrosion oil and wrapped into plastic foil.

This will protect the steel cover against corrosion during transport and longer storage periods.

Please lubricate the entire steel cover from the outside before operation.

SERVICE & QUALITY	02
STANDARD BELLOWS	08
SAUWRAI BELLOWS	18
SPECIAL BELLOWS	26
BACKWALL SYSTEMS	36
GLADIATOR STEEL COVERS	41
ROLLER SYSTEMS	46
DURASPRING SPIRAL SPRINGS	58
VIEWING SYSTEMS	68

## MAINTENANCE AND CARE

02

SERVICE &amp; QUALITY

GLADIATOR Telescopic steel covers require regular maintenance during use. To avoid damage, they should be inspected and cleaned regularly, depending on the degree of contamination.

08

STANDARD BELLOWS



GLADIATOR Telescopic steel cover, sample

18

SAUMIRAI BELLOWS

26

SPECIAL BELLOWS

34

BACKWALL SYSTEMS

### Surface of the steel covers

Please extend the steel covers and clean off any dirt. Next you should rub the steel cover with an oil-soaked cloth. This will prevent early wear and corrosion.

42

GLADIATOR STEEL COVERS



GLADIATOR Telescopic steel cover, extended

46

ROLLER SYSTEMS

58

DURASPRING SPIRAL SPRINGS

68

VIEWING SYSTEMS

Do not clean by compressed air, because foreign particles may be forced into the interior of the steel cover.

### Steel covers and chip exposure

When heavily exposed to chip, the steel cover should be checked frequently and regularly for ingress of swarf.

If swarf is found on the inside, the steel cover should be disassembled and cleaned carefully.

Chips located in between the boxes will cause rapid deterioration of the steel cover.

### Maintenance

Regular preventive maintenance is the basis for long-term and reliable operation.

Please ensure that the following wearing parts are exchanged at regular intervals, depending on wear:

- Guideways
- Wipers
- Gliders and rollers
- Pantographs
- Seals

### Guideways

To inspect the guideways of the machine, compress the steel cover and disconnect at the largest box.

Take this opportunity to spray the underside of the cover with oil.

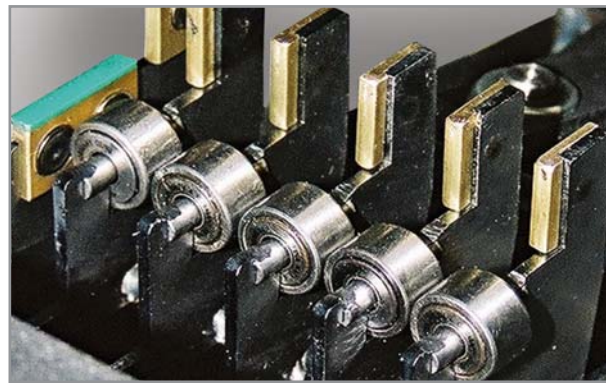
### Wipers

Wipers and their lips should be inspected frequently and regularly. Please renew the wipers and lips if the adjoining box sections are no longer in proper contact.

This can be recognised by smear formation or remaining deposits of coolant and chips.

### Gliders

Please renew the gliders when their bearing surfaces show heavy wear or deformation or when chips have penetrated.



Roller and glider

### Seals

Regularly check joints which had been treated with sealant. Should these seals detach or dissolve, e.g. by aggressive coolants, they have to be replaced with appropriate sealant (e.g. PU or silicon).

### Safety information

Please consider the safety information in the service and maintenance manual included with each delivery.

# WIPERS FOR TELESCOPIC STEEL COVERS

The wiper systems for steel covers can be sub-divided into three main groups:

- Types P 01/P 02/P03 - wiper lip cannot be replaced
- Types DSP/DV/LP - wiper lip can be replaced
- Types LV - wiper system can be replaced. Replacing of wiper lip **without dismantling of cover**

## Wiper type P 01/P 02/P03

Wiper of types P 01/P 02 can be used universally. They can be used horizontally for telescopic steel covers or vertically for guideway wipers. A polyurethane wiper lip is vulcanised onto one or two steel profiles and thus permanently bonded. An additional support by steel frame is available as an option. When worn, the complete wiper must be replaced. These wipers lips are available in lengths of 500 mm.

## Wiper Type DSP/DV/LP

Wiper lips of these types can be replaced when worn. The service should be done by professional service personnel. They are fixed by spot welding. These wipers are compatible with many systems common in the marketplace. The metal profiles are produced from stainless steel.

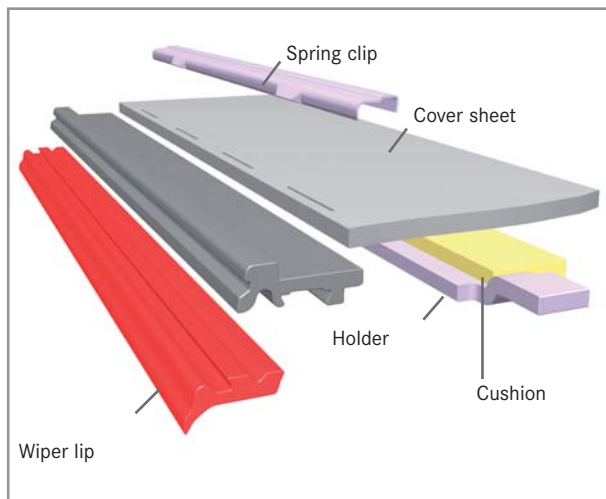
Wiper lips are available in lengths from 1,000 to 10,000 mm, metal profiles from 1,000 to 3,000 mm length. Wiper lips and metal profiles can be ordered separately.

## Wiper Type LV

This innovative system enables a significant reduction of maintenance time and costs. The wiper lips of type LV can easily be changed when worn. Replacement can be made by customers own personnel. For replacement of the wiper lip, only the spring clips have to be loosened, and the profile with wiper removed and replaced.

**There is no further dismantling of the cover required.**

In comparison to standard wiper systems, machine down time can be reduced by up to 15%.



LV Wiper System

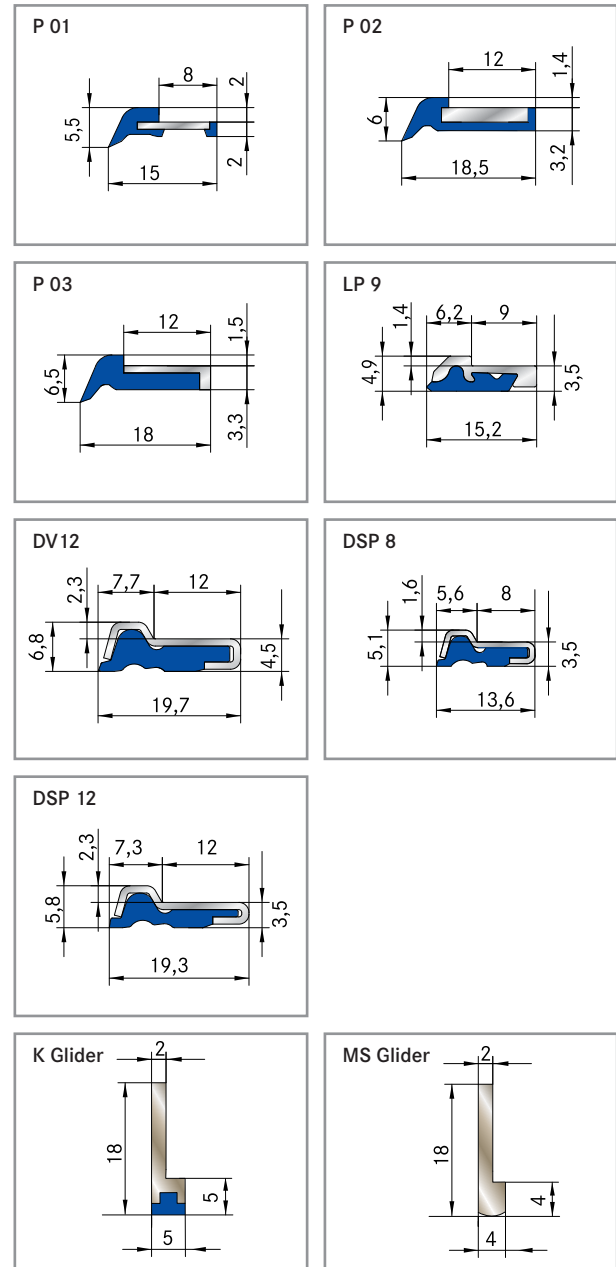
Wiper lips are available in lengths from 1,000 to 10,000 mm, metal profiles from 1,000 to 3,000 mm.

## Material of wiper lips

The wiper lips are manufactured from high-grade polyurethane and offer good mechanical and chemical properties.

They are temperature resistant up to a maximum of 130°C (natural rubber up to 135°C), continuously up to 90°C (natural rubber up to 100°C).

## Wiper profiles for Telescopic Steel Covers



SERVICE & QUALITY	02
STANDARD BELLOWS	08
SAUWRAI BELLOWS	18
SPECIAL BELLOWS	26
BACKWALL SYSTEMS	36
GLADIATOR STEEL COVERS	43
ROLLER SYSTEMS	46
DURASPRING SPIRAL SPRINGS	58
VIEWING SYSTEMS	68

## WIPERS FOR GUIDEWAYS

02

SERVICE &amp; QUALITY

The guideways of machine tools must be kept free of chips and debris. Therefore wipers are important.

Wipers for guideways are designed specifically to occupy minimum space.

08

STANDARD BELLOWS

These wipers can be produced in different forms, dimensions, and in different materials. For each application there will be an optimal version available.

18

SAUWRAI BELLOWS

For guideway wipers there are four different types available:

- Wiper Type P
- Wiper Type L
- Wiper Type S - for welded wiper
- Individual designed, vulcanised wiper

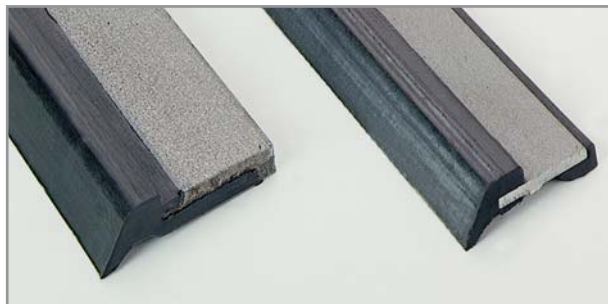
26

SPECIAL BELLOWS

### Wiper type P

Wipers of this type can be used universally. They can be mounted horizontally for Telescopic Steel Covers or vertically for guideways.

A polyurethane lip with a steel core is vulcanised to a steel profile. An additional steel band reinforcement is available as an option.



Wiper type P

44

GLADIATOR STEEL COVERS

46

ROLLER SYSTEMS

58

DURASPRING SPIRAL SPRINGS

68

VIEWING SYSTEMS



Wiper type L

### Wiper type S

These wipers are equipped with a special two-sided lip, providing rear sealing to coolant.

Its outer support of nickel chromium steel offers high rigidity and stability under load.



Wiper type S with additional metal wiper

### Individual wiper

Vulcanised wiper systems are available according to customer's drawing. They can be produced in many forms.

For economic production a minimum of 20 pieces must be ordered.



Individually designed type with vulcanised wiper lip

### Design

Standard wipers are available in the following lengths:

- Wiper Type P: 500 mm
- Wiper Type L: 500 mm
- Wiper Type S: 530 and 1,000 mm

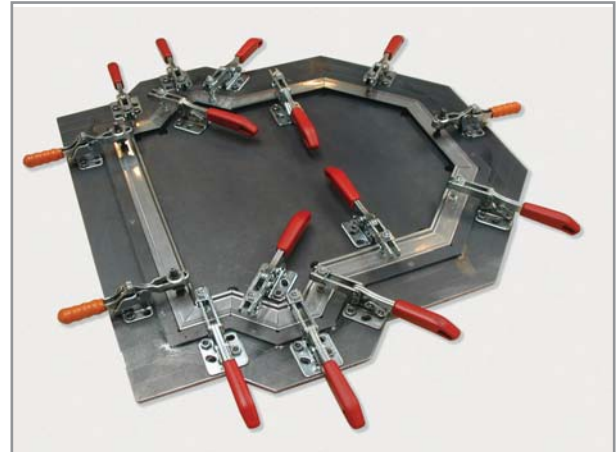
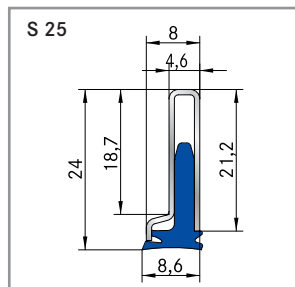
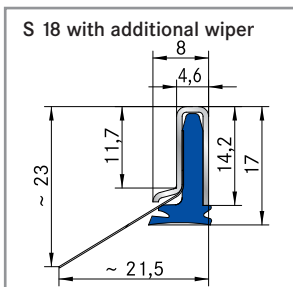
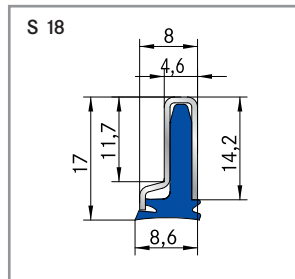
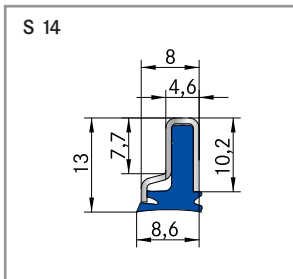
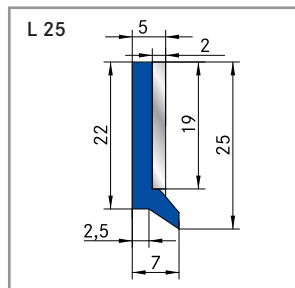
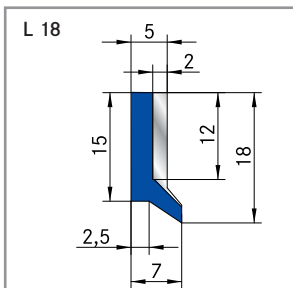
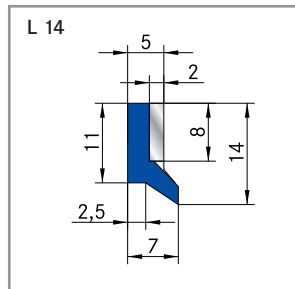
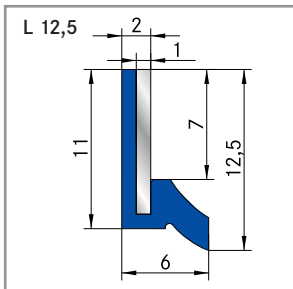
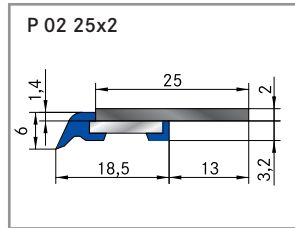
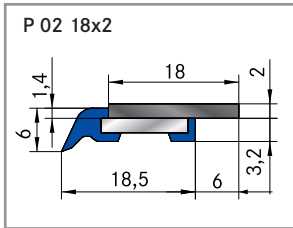
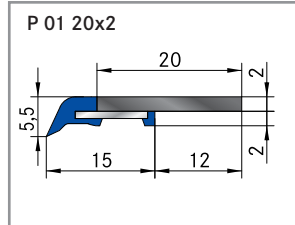
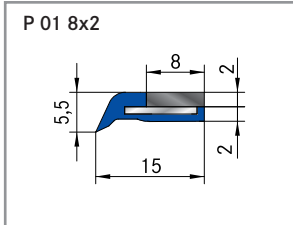
Wipers according to customer's specification can be produced. Additionally they can be equipped with an extra steel wiper. Preload of wiper is generally 1 mm.

### Material wiper

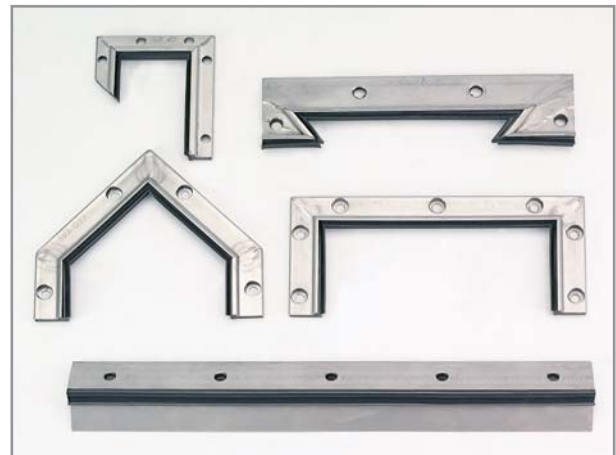
- Polyurethane
- Temporary temperature resistant up to 130°C
- Permanent temperature resistant up to 90°C
- Resistant to mineral oils and coolants
- Excellent resistance to absorption
- High resistance to micro-organisms

# WIPERS FOR GUIDEWAYS

## Wipers for guideways



Preparation of wiper



Individual designed wiper according to customer's requirements

SERVICE & QUALITY	02
STANDARD BELLOWS	08
SAUWRAI BELLOWS	18
SPECIAL BELLOWS	26
BACKWALL SYSTEMS	36
GLADIATOR STEEL COVERS	45
ROLLER SYSTEMS	46
DURASPRING SPIRAL SPRINGS	58
VIEWING SYSTEMS	68